

IS THE BREAD MAKING TECHNOLOGICAL ABILITY OF PORTUGUESE TRADITIONAL MAIZE LANDRACES ASSOCIATED WITH THEIR GENETIC DIVERSITY?

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ABSTRACT - Through several centuries of natural and human selection, a very diverse maize germplasm has been developed in Portugal. Portuguese maize landraces have been preserved on farm, due to particular quality traits not found on their competing modern hybrid varieties. These landraces are mainly flint type open pollinated varieties (OPV) with technological ability for the production of the traditional maize leavened bread called "broa". To clarify if the quality of these landraces is related with their genetic diversity, 46 OPVs collected from a known high quality maize bread Portuguese region, plus six participatory maize improved Portuguese landraces and two American populations as controls, were analyzed for eight different parameters related with their technological ability for bread production, and 13 SSR markers. Using three different multivariate analyses including principal component, cluster and discriminant analysis it was possible to classify these OPVs into three distinct clusters based on the quality traits. However, the farmer's selection has not resulted in changes in the genetic diversity population structure. Quality group A and group B are not significantly different at genetic level. Still, the studied populations are characterized by a broad genetic diversity. Based on the existence of diversity at molecular level and high quality, the Portuguese maize landraces conserved on farm represent valuable germplasm with high potential for bread quality improvement. On farm breeding projects taking into consideration quality aspects should be promoted as a way to preserve and improve these unique maize landraces in risk of disappearing.

KEY WORDS: *Zea mays*; Portuguese maize landraces; Open-pollinated varieties; Bread making ability; Genetic diversity.